

F. Raymond Fosberg: An Appreciation¹

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RAY FOSBERG IS A WASHINGTONIAN twice over, for he was born in Spokane, Washington, on 20 May 1908, and has spent much of his professional life in Washington, D.C., an eminently suitable base for a career that has spanned both the islands and continents of the world over a period of more than 60 years.

Ray was educated in primary and secondary schools of the states of Washington and California between 1914 and 1926. He attended Pomona College, Claremont, California, enrolling in, among other courses, botany, zoology, chemistry, and geology. His first scientific (ecological) paper was published in 1929 (Fosberg 1929), and he graduated with a B.A. in botany in 1930. His first professional position, which he held from 1930 to 1932, was as a botanist in the Los Angeles County Museum. The job included a botanical expedition to southern New Mexico, in 1930, a trip that resulted in several small publications. During the years 1926–1932 he collected and gained a working knowledge of the flora of the southwestern United States and northwestern Mexico. At that time he also began what became a life-long interest in island floras with visits and studies on islands off the coasts of California and Baja California.

In 1932 Dr. Fosberg accepted an assistantship with Professor Harold St. John at the University of Hawaii in Honolulu, Hawaii. That appointment initiated a lasting interest in Pacific island floras, for he began his studies not only of the Hawaiian flora, but of other Pacific island floras by participating in the Bishop Museum-sponsored Mangarevan Expedition, spending six months on islands in the South Pacific. In 1935, he was awarded the M.S. in botany at the University of Hawaii for his thesis on the genus *Gouldia* (Rubiaceae)

(Fosberg 1935). He has maintained that early interest in the Rubiaceae, as he has that in the flora and vegetation of tropical islands.

POLYNESIAN AND SOUTH AMERICAN RUBIACEAE. A Morris Arboretum Fellowship in Botany at the University of Pennsylvania led to the award of the Ph.D. degree in 1939. Ray Fosberg's thesis was a monographic revision of the Polynesian species of *Hedyotis* (Rubiaceae) (Fosberg 1943), written under the direction of Professor John M. Fogg, Jr. In Philadelphia he made ample use of the incomparable scientific library at the Academy of Natural Sciences and learned much from the scientists of that institution. With his Ph.D. in hand, he became assistant botanist in the U.S. Department of Agriculture, Washington, D.C., a position that broadened his botanical interests by exposure to applied botany, yet also allowed him spare time to undertake studies of the flora and vegetation of the eastern United States.

In 1942 Fosberg was sent to Colombia to search for stands of the genus *Cinchona* (Rubiaceae), a source of quinine and related antimalarial alkaloids. He became an authority on the taxonomy of *Cinchona* and related genera of Rubiaceae. He also developed an intense interest in the vegetational geography of the Andes and the South American rainforest. A John Simon Guggenheim Memorial Foundation fellowship awarded in 1947 provided for further travel and study of *Cinchona* as well as study of the floras and vegetation of Central and South America.

PACIFIC ISLANDS. The South American work was briefly interrupted in 1946, when Fosberg was asked to participate as botanist in a six-month "Economic survey of Micronesia" for the U.S. Commercial Company of Micronesia (Fosberg 1946). This work initiated what was to become a continuing study of the flora and vegetation of Pacific

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islands, and to place Ray Fosberg at the focal point in studies of island ecosystems and conservation.

A temporary appointment as visiting professor at the University of Hawaii in 1948 was followed in 1949 by a general study of Pacific Island vegetation supported by the U.S. Geological Survey and the U.S. Office of Naval Research through the Pacific Science Board of the National Research Council. An important offshoot of this was the Pacific Science Board's Coral Atoll Program, in which Dr. Fosberg played a principal role, founding and editing the *Atoll Research Bulletin*, of which there are now 346 issues dealing with island science in all its aspects.

From 1950 until her death in 1986, Ray was ably and effectively assisted by Dr. Marie-Helene Sachet, who became a world authority on coral atolls, and with whom he assembled *Island Bibliographies* (Sachet and Fosberg 1955) and its *Supplement* (Sachet and Fosberg 1971). With M.-H. Sachet and David R. Stoddart, Fosberg participated in a successful campaign for the protection of the western Indian Ocean island of Aldabra. Indeed, he himself spent two months on Aldabra in 1968 and, with S. A. Renvoize, wrote and published a *Flora of Aldabra and Nearby Islands* (Fosberg and Renvoize 1980).

In 1949 Ray Fosberg took part in the first of eight Pacific Science Congresses, the latest in Honolulu in 1991 where he presented two papers. He chaired the Standing Committee on Botany at three Congresses (1953, 1957, 1961); and organized with UNESCO cooperation two symposia, one on Climate, Vegetation and Rational Land Utilization in the Humid Tropics in Bogor in 1957 (Fosberg 1959) and the other, Man's Place in the Island Ecosystem, in Honolulu in 1961 (Fosberg 1963). He led the post-congress botanical excursion after the 1961 Congress in Hawaii (Fosberg 1961). He has also participated in four International Coral Reef Conferences.

Among his interests and contributions to Pacific island botany are major descriptive treatments of the vegetation of central Pacific atolls (Fosberg 1954) and of Micronesia (Fosberg 1960), which include publications on the geography and the natural history of the

Marshall Islands (Fosberg 1954, 1956) and, with D. R. Stoddart and M.-H. Sachet, a flora of the sand cays of the northern Great Barrier Reef (Fosberg, Stoddart, and Sachet, in preparation). He has, since 1932, published more than 70 papers on the vegetation and flora of the Hawaiian Islands. The work on Pacific vegetation continues under various auspices, including active involvement with Professor Dieter Mueller-Dombois and Dr. Ross McQueen on a volume on Pacific Island vegetation. His work on the taxonomy of island plants also continues, with particular concern for the Micronesian and Polynesian floras. He, with Dr. Sachet and Royce Oliver, published a geographical checklist of Micronesian plants (1979, 1982, 1987), and the first four parts of a descriptive flora of Micronesia (Fosberg and Sachet 1975); a fifth part is in manuscript.

A special interest during the last few years is a project to locate and study the Pacific island plant collections gathered by Reinhold and Georg Forster, naturalists on Cook's second voyage. These collections were the bases, except for the faithfully transcribed chapter on plants used for food and medicine in Tahiti by Sidney Parkinson (1773), of the earliest publications on Pacific island botany. He has seen most of the specimens, which are scattered in at least 27 herbaria around the world. His aim is to select lectotypes of as many of the species based on the original material as have not been satisfactorily typified.

OTHER INTERESTS; OTHER WORK. The flora and vegetation of Pacific islands are but one aspect of Ray Fosberg's full life, for he has also been interested in, and significantly contributed to, botanical taxonomy and the knowledge of floras and vegetation of continental America, the humid tropics, and Caribbean islands.

A brief but important participation in the First International Symposium on Plant Taxonomy and Nomenclature at Utrecht, the Netherlands, in the summer of 1948 firmed up a lasting interest in botanical nomenclature, and he has since been an active participant in the Nomenclature Sections of eight International Botanical Congresses and a member of

the Standing Committee for Spermatophyte Nomenclature. He was an honorary vice-president of the 8th and 12th International Botanical Congresses in Paris and Leningrad.

From 1950 to 1965 Fosberg was employed as a botanist by the U.S. Geological Survey, where he contributed vegetation sections to many geological studies. In 1966, his activities were transferred from the Geological Survey to the Smithsonian Institution, first, as special advisor on tropical biology, and later, as curator of botany and senior botanist. Major activities under Smithsonian sponsorship and financing were projects on the plant ecology of Ceylon and on a revised *Handbook to the Flora of Ceylon* (Dassenayake and Fosberg 1980–1991). Seven volumes of the new Ceylon Flora have been published; three others are in progress. In compiling the flora, Fosberg obtained enormous herbarium collections, placing sets in the herbaria at Peradeniya and Washington, and duplicates were distributed to many other herbaria. A large number of botanists from many countries participated in these projects, and a generation of Ceylonese botanists received valuable training as assistants in these projects.

Other productive activities and interests include participation in a UNESCO-organized symposium on the humid tropics in 1954 that led to the establishment of the UNESCO International Committee on Humid Tropics Research of which he was chairman for the greater part of its existence, from 1956 to 1964; and participation in the International Biological Program from 1967 to 1972 where he was active especially in its Terrestrial Conservation Directorate, primarily producing the IBP "Classification of Vegetation for General Purposes" (Fosberg 1967). He has also been involved in a field course in tropical botany in St. Croix, U.S. Virgin Islands, and a flora of the sand cays of Belize.

THE NECESSITY FOR CONSERVATION. Before he had even heard the word *conservation*, Ray Fosberg had developed a serious interest in nature and was concerned and perturbed by the destruction and loss of natural beauty around him. As early as 1949 he was writing on rare and vanishing plant species (Fosberg

1949). This interest led to active participation in nature protection and conservation organizations and activities. He served for 10 years as president of the International Society for Tropical Ecology. He was invited and participated in all four International Conferences on Environmental Future and was active in numerous other conferences, congresses, and symposia in ecology and conservation. He was involved in the early years of the development of the (U.S.) Nature Conservancy, and in its formative years he served as a board member and two terms as vice-president. But most important, he has managed, in one way or another, to bring a conservation perspective into all of his scientific and public service pursuits. Talking and writing on conservation, especially in the international conservation field, have brought him a secure place in the history of conservation, although much of his work has been behind the scenes.

TO CELEBRATE RAY FOSBERG. Ray Fosberg does not lack for honors. He has been awarded four honorary degrees, the first by Pomona College in 1980, the others by the University of Guam (1985), the University of Peradeniya (1986), and the University of the South Pacific (1989). He is the recipient of, among others, the Fermat Bronze Medal, the H. E. Gregory Medal, the George Davidson Medal, the Edward W. Browning Achievement Award, and the Robert Allerton Medal. He is author of more than 660 publications, small and large, involving an enormous range of topics from taxonomy to vegetation, from ecosystems to human life, and from islands to continents. His name is associated with vast numbers of documented specimens that he has deposited in the herbaria and museums of the world. Extensive travel has provided him with the broadest of concepts of world patterns of geography, vegetation, coral reefs, and of islands and their life, a view equaling if not surpassing that of any living botanist. Most significantly, however, he has advised and helped innumerable younger colleagues in developing their careers and their ethic to conserve the animals and plants of the world. This may well be his greatest honor.

In May 1978, Dr. Fosberg was officially

retired, assuming the title botanist emeritus of the Smithsonian Institution. Retirement has made little difference in his life for he continues to work regularly and actively on several projects, and he allows no field trip to pass him by without joining in with notebook and plant press in hand.

LITERATURE CITED

- DASSANAYAKE, M. D., and F. R. FOSBERG, eds. 1980–1991. A revised handbook to the flora of Ceylon. Vols. I–VII. Amarind Co. Pvt. Ltd., New Delhi, for the Smithsonian Institution and the National Science Foundation, Washington, D.C.
- FOSBERG, F. R. 1929. Preliminary notes on the fauna of the giant kelp, *Macrocystis pyrifera*. Pomona Coll. J. Entomol. Zool.
- . 1935. Revision of the genus *Gouldia* (Rubiaceae). M.S. thesis, University of Hawaii, Honolulu.
- . 1943. The Polynesian species of *Hedyotis* (Rubiaceae). Bull. Bernice P. Bishop Mus. 174:1–102.
- . 1946. Economic survey of Micronesia, vol. 11. Microfilm. Washington, D.C.
- . 1949. The problem of rare and vanishing plant species. Proc. Pap. Int. Tech. Conf. Protect. Nat.: 502–504.
- . 1954. Soils of the northern Marshall Atolls, with special reference to the Jemo Series. Soil Sci. 78:99–107.
- . 1956. Military geography of the northern Marshalls. Prepared under the direction of the Chief of Engineers, U.S. Army Intelligence Division, Office of the Engineer Headquarters, U.S. Army Forces Far East and Eighth U.S. Army with personnel of the U.S. Geological Survey.
- . 1959. Climate, vegetation and rational land utilization in the humid tropics: Introduction. Proc. 9th Pac. Sci. Congr. 20:1–3.
- . 1960. The vegetation of Micronesia 1. General description, the vegetation of the Marianas Islands, and a detailed consideration of the plants of Guam. Bull. Am. Mus. Nat. Hist. 119:1–75.
- . 1961. Guide to Excursion III. 10th Pacific Science Congress, Honolulu. 207 pp.
- . 1967. A classification of vegetation for general purposes. Pages 73–120 in Guide to the check sheet for IBP areas 67G. Peterken IBP Handbook no. 4. Blackwell Scientific Publications, Oxford and Edinburgh.
- FOSBERG, F. R., ed. 1963. Man's place in the island ecosystem. Bishop Museum Press. 264 pp.
- FOSBERG, F. R., and S. A. RENVOIZE. 1980. The flora of Aldabra and neighboring islands. Kew Bull. Additional Series 7. H. M. Stationery Office, London.
- FOSBERG, F. R., and M.-H. SACHET. 1975. Flora of Micronesia. Smithson. Contrib. Bot. nos. 20, 24, 36, 46.
- FOSBERG, F. R., M.-H. SACHET, and R. OLIVER. 1979. Geographical checklist of Micronesian Dicotyledonae. Micronesica 15: 14–295.
- . 1982. Geographical checklist of Micronesian Pteridophytae and Gymnospermae. Micronesica 18:23–82.
- . 1987. Geographical checklist of Micronesian Monocotyledonae. Micronesica 20:19–129.
- PARKINSON, S. 1773. A journal of a voyage to the South Seas, in His Majesty's Ship, the Endeavour.... Stanfield Parkinson, London.
- SACHET, M.-H., and R. F. FOSBERG. 1955. Island bibliographies. National Academy of Sciences—National Research Council Publ. 335.
- . 1971. Island bibliographies supplement. Pacific Science Board and National Academy of Sciences. NRC Rep. No. 1932. Reproduced by National Technical Information Service, Springfield, Virginia.